

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method comprising:
classifying an incoming packet into one of a plurality of flows;
determining an estimate of a load of the plurality of flows on a scarce resource, wherein determining comprises aggregating a plurality of normalized flow load estimates for each of the plurality of flows based on at least one of a plurality of cost scaling factors; and
implementing a drop policy for at least one flow when the estimate exceeds a predicted threshold.
2. (Currently Amended) The method of Claim 1 wherein determining further comprises:
aggregating a cost estimate of all packets within a flow to generate a flow load estimate for each flow; and
summing the normalized individual flow load estimates to yield a the total load estimate.
3. (Original) The method of Claim 1 further comprising:
allocating a portion of the scarce resource to each flow of an expected plurality of flows.
4. (Currently Amended) The method of Claim 3 further comprising:
identifying which flows of the plurality of flows ~~exceeds~~ exceed their allocation.
5. (Original) The method of Claim 4 further comprising:
distributing excess capacity from flows that do not exceed their allocation to those flows that exceed their allocation.
6. (Currently Amended) The method of Claim 1 wherein implementing the drop policy comprises:
computing a ~~reduction~~ drop factor based on aggregate over utilization of ~~the~~ a scarce resource processor; and
enabling the dropping of a packet based on the drop factor.

7. (Currently Amended) The method of Claim 1 wherein implementing a the drop policy comprises:

- accessing a location in a drop buffer;
- dropping a current packet if the location has a first value;
- serving the current packet if the location has a second value; and
- advancing a buffer pointer to point to a next buffer location.

8. (Original) The method of Claim 1 wherein the drop policy is established on a flow by flow basis.

9. (Currently Amended) The method of Claim 1 wherein determining comprises:
generating a ~~cost factor~~ for an incoming packet at least one of the plurality of cost scaling factors
based on at least one of packet type and packet length.

10. (Currently Amended) The method of Claim 6 wherein ~~computer~~ computing comprises:
determining a total under utilization by flow not exceeding an expected load on the scarce resource;
adding the total under utilization to an expected load of excessive flows; and
dividing the sum by an offered load of excessive flows.

11. (Original) The method of Claim 1 further comprising:
decreasing the predicted threshold if the scarce resource is over utilized when the load is equal to the predicted threshold; and
increasing the predicted threshold if the scarce resource is under utilized at the predicted threshold.

12. (Original) The method of Claim 11 wherein each decrease has a greater absolute value than each increase.

13. (Currently Amended) A computer readable storage media containing executable computer program instructions which when executed cause a digital processing system to perform a method comprising:

classifying an incoming packet into one of a plurality of flows;
determining an estimate of a load of the plurality of flows on a scarce resource, wherein
determining comprises aggregating a plurality of normalized flow load estimates for each of the
plurality of flows based on at least one of a plurality of cost scaling factors; and
implementing a drop policy for at least one flow when the estimate exceeds a predicted threshold.

14. (Currently Amended) The computer readable storage media of Claim 13 which when executed cause a digital processing system to perform a method further comprising:

aggregating a cost estimate of all packets within a flow to generate a flow load estimate for each flow; and
summing the normalized individual flow load estimates to yield a the total load estimate.

15. (Original) The computer readable storage media of Claim 13 which when executed cause a digital processing system to perform a method further comprising:

allocating a portion of the scarce resource to each flow of an expected plurality of flows.

16. (Currently Amended) The computer readable storage media of Claim 15 which when executed cause a digital processing system to perform a method further comprising:

identifying which flows of the plurality of flows ~~exceeds~~ exceed their allocation.

17. (Original) The computer readable storage media of Claim 16 which when executed cause a digital processing system to perform a method further comprising:

distributing excess capacity from flows that do not exceed their allocation to those flows that exceed their allocation.

18. (Currently Amended) The computer readable storage media of Claim 13 which when executed cause a digital processing system to perform a method further comprising:

computing a reduction drop factor based on aggregate over utilization of the a processor; and
enabling the dropping of a packet based on the drop factor.

19. (Original) The computer readable storage media of Claim 13 which when executed cause a digital processing system to perform a method further comprising:

accessing a location in a drop buffer;

dropping a current packet if the location has a first value;

serving the current packet if the location has a second value; and

advancing a buffer pointer to point to a next buffer location.

20. (Original) The computer readable storage media of Claim 13 which when executed cause a digital processing system to perform a method further comprising:

the drop policy is established on a flow by flow basis.

21. (Currently Amended) The computer readable storage media of Claim 13 which when executed cause a digital processing system to perform a method further comprising:

generating a cost factor for an incoming packet at least one of a plurality of cost scaling factors based on at least one of packet type and packet length.

22. (Original) The computer readable storage media of Claim 18 which when executed cause a digital processing system to perform a method further comprising:

determining a total under utilization by flow not exceeding an expected load on the scarce resource;

adding the total under utilization to an expected load of excessive flows; and

dividing the sum by an offered load of excessive flows.

23. (Original) The computer readable storage media of Claim 13 which when executed cause a digital processing system to perform a method further comprising:

decreasing the predicted threshold if the scarce resource is over utilized when the load is equal to the predicted threshold; and

increasing the predicted threshold if the scarce resource is under utilized at the predicted threshold.

24. (Original) The computer readable storage media of Claim 23 wherein each decrease has a greater absolute value than each adjustment upward.

25. (Currently Amended) An apparatus comprising:

a network input interface; and

a processor coupled to the input interface and having a capacity, the processor enabling the actions comprising:

determining an estimate of a load of plurality of flows on a scarce resource, wherein determining comprises aggregating a plurality of normalized flow load estimates for each of the plurality of flows based on a corresponding one of a plurality of cost scaling factors; and

implementing a drop policy at the input interface for at least one flow when the estimate exceeds a predicted threshold.

~~to implement a drop policy at the input interface when aggregate utilization of the processor by a plurality of flows exceeds a threshold.~~

26. (Original) The apparatus of Claim 25 further comprising:

a memory coupled to the processor to store a drop buffer, the drop buffer populated to simulate randomization of drop events based on a drop factor.

27. (Currently Amended) The apparatus of Claim 26 wherein the memory stores the drop buffer as a cyclic buffer corresponding to each supported ~~reduction~~ drop factor.

28. (Original) The apparatus of Claim 25 wherein the processor implements a packet to flow classification algorithm to group incoming packets into flows.

29. (Original) The apparatus of Claim 25 wherein the threshold is approximately equal to the capacity.